

REMARKS

The Examiner is thanked for the courteous telephone interview granted Applicants' representative on March 9, 2004. The present Amendment has been prepared to respond to comments and suggestions made during the interview, and is believed to place the application in condition for allowance.

Amendments have been made to the specification to correct typographical errors noted therein. No new matter has been added by any of the amendments.

Claims 1-36 remain pending in the present application. Independent claims 1, 7, 13, 19, 25 and 31 have been amended to more clearly distinguish the present invention over the cited art. No claims have been added. Applicants believe that claims 1-36, as presented herein, patentably distinguish over the cited art and are allowable in their present form. Reconsideration of the rejection is, accordingly, respectfully requested in view of the above amendments and the following comments

I. 35 U.S.C. § 103, Obviousness, Claims 1, 3, 4, 6, 7, 10, 12, 13, 15, 16, 18, 19, 22, 24, 25, 27, 28, 30, 31, 34 and 36

The Examiner has rejected claims 1, 3, 4, 6, 7, 10, 12, 13, 15, 16, 18, 19, 22, 24, 25, 27, 28, 30, 31, 34 and 36 under 35 U.S.C. § 103(a) as being unpatentable over Applicants' admission of prior art on pages 1 and 2 of the specification, in view of U.S. Patent No. 5,822,692 to Krishan et al. This rejection is respectfully traversed.

The present invention is directed to a technique for updating system firmware, for example, system power control network (SPCN) firmware, as a background operation to permit a data processing system to be used for other purposes during the updating process. As pointed out on page 2, lines 5-12 of the specification:

This SPCN firmware typically takes 45 minutes to complete for a four (4) drawer computer system. If there are more drawers in the system, then it will take longer than 45 minutes to update. Currently, the operating system cannot be loaded until this firmware update is finished. Thus, the user may have to wait an hour or more before the system is usable.

In accordance with the present invention, updating firmware, such as SPCN firmware, is delayed until a notification is received that control has been transferred to a host operating system or until an operating system has been loaded, following completion of an initialization procedure. With the present invention, therefore, the service processor and the SPCN cards are available to assist the system firmware in the initialization procedure. After control has been transferred to a host operating system or after the operating system has been loaded, following completion of the initialization procedure, however, the service processor is no longer needed by the system firmware, and may then be used to update the SPCN firmware in the background while the data processing system is available to a user for other actions.

In rejecting the claims as being unpatentable over Applicants' admission of prior art (hereinafter "APA") in view of Krishan et al. (hereinafter as "Krishan"), the Examiner states:

As per claim 1, APA discloses:

Determining, by a service processor, whether a system component has a current level of the firmware (page 1 line 32 - page 2 line 5: "At this time, the SPCN task will read the SPCN firmware level (i.e. version) on the service processor flash. If that firmware level does not match with the level of firmware on the SPCN card, then the SPCN task will transmit a new SPCN firmware image to the SPCN card while the OS is running." The SPCN task is run by the service processor.); and responsive to a determination that the system component does not have the current level of the firmware, updating a copy of the firmware stored in the system component (page 2 lines 2-5 as cited above).

APA does not disclose updating after transferring control to a host operating system in a background operation while the data processing system remains available to a user for other actions.

However, in an analogous environment, Krishnan teaches updating the firmware on a PCMCIA device (column 16 lines 8-10: "If the host has a newer version of the firmware, it transmits the newer version to data communication device 10 via TDX line 140.") The operation of transmitting is inherently performed under the control of a host operating system that conforms to the PCMCIA standard. Furthermore, operation of a PCMCIA device inherently allows the device to be powered on, powered off, and updated in a background operation of the host operating system according the PCMCIA standard (note that further information regarding PCMCIA technology can be found in "An Introduction to PCMCIA and PC Card Technology" by Synchrotech).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the firmware update method of APA with Krishan's background update. One of ordinary skill in the art would have been motivated to update the firmware of a device independently in a background operation of the host operating system.

Office Action dated December 18, 2003, pages 2 - 3.

Krishan is directed to a data communication device, such as a pager or e-mail receiver, that can be connected to a host computer. Among other features of the data communication device, Krishan discusses a procedure by which firmware of the device can be updated. In particular, in column 16, lines 14-33, Krishan recites:

Referring again to FIG. 4C, in normal operation radio frequency controller circuit 80 will execute the instructions loaded into program memory 81, while data memory 82 is used to store data. However, during the process of updating the firmware, radio frequency controller circuit 80 toggles multiplexer 84, to switch ROM_OE line 179 and RAM_OE line 180 and to switch terminals 181 and 182. As a result, radio frequency controller circuit 80 temporarily executes the instructions in data memory 82, rather than in program memory 81. Updating instructions in data memory 82, which were transmitted with the new firmware, direct radio frequency controller circuit 80 to load the new firmware from data memory 82 into program memory 81, thereby updating the firmware for radio frequency controller 46. After program memory 81 has been updated, the updating instructions in data memory 82 direct radio frequency controller circuit 80 to run a reinitiation routine, during which multiplexer 84 is returned to its initial setting. After running the reinitiation routine, the updating of the firmware of radio frequency circuitry 36 is complete.

In Krishan, it is an objective to update firmware in a data communication device by, for example, downloading the updated firmware from a host. The reference does not discuss any conditions that must be satisfied before updating can occur. In the present invention, on the other hand, firmware in a data processing system is updated responsive to receiving a notification that control has been transferred to a host operating system or that an operating system has been loaded, following an initialization procedure.

In order to better emphasize differences between the present invention and a method such as disclosed in Krishan, claim 1 has been amended herein to read as follows:

1. A method of updating firmware in a system component within a data processing system, the method comprising:
 - responsive to receiving a notification that control has been transferred to a host operating system following completion of an initialization procedure, determining, by a service processor, whether the system component has a current level of the firmware; and
 - responsive to a determination that the system component does not have the current level of the firmware, updating a copy of the firmware stored in the system component in a background operation while the data processing system remains available to a user for other actions.

Neither APA nor Krishan discloses or suggests the step of "responsive to receiving a notification that control has been transferred to a host operating system following completion of an initialization procedure, determining, by a service processor, whether the system component has a current level of the firmware", and then updating the firmware responsive to a determination that the system component does not have the current level of the firmware. Therefore, the combination of APA and Krishan does not teach or suggest the present invention, and claim 1 should be allowable in its present form.

Claims 3, 4 and 6 depend from and further restrict claim 1, and should also be allowable in their present form, at least by virtue of their dependency.

Independent claims 13 and 25 have been amended in a manner similar to claim 1, and should also be allowable in their present form, together with claims 15, 16, 18, 27, 28 and 30 depending therefrom.

Independent claim 7, as amended herein recites:

7. A method for updating system firmware in a data processing system, the method comprising:
 - in the background, and responsive to receiving a notification that an operating system has been loaded following completion of an initialization procedure, determining whether a level of a firmware copy on a system component matches a current level of firmware stored on a non-volatile memory within the system; and
 - responsive to a determination that the level of the firmware copy is different from the current level, transferring the current level of firmware to the system component to update the firmware copy on the system component.

For similar reasons as discussed above with respect to claim 1, neither APA nor Krishan discloses or suggests the step of "responsive to receiving a notification that an operating system has been loaded following completion of an initialization procedure, determining whether a level of a firmware copy on a system component matches a current level of firmware stored on a non-volatile memory within the system. Accordingly, claim 7 should also be allowable in its present form, together with claims 10 and 12 dependent thereon.

Independent claims 19 and 31 have been amended in a manner similar to claim 7, and should also be allowable in their present form, together with claims 22, 24, 34 and 36 dependent thereon.

Therefore, the rejection of claims 1, 3, 4, 6, 7, 10, 12, 13, 15, 16, 18, 19, 22, 24, 25, 27, 28, 30, 31, 34 and 36 under 35 U.S.C. § 103 has been overcome.

II. 35 U.S.C. § 103, Obviousness, Claims 2, 8, 14, 20, 26 and 32

Claims 2, 8, 14, 20, 26 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over APA and Krishan, and further in view of U.S. Patent No. 6,357,021 to Kitagawa et al. (hereinafter "Kitagawa"). Kitagawa is cited as disclosing notifying a user of a firmware update failure.

Kitagawa, however, does not supply the deficiencies in APA and Krishan as discussed above, and claims 2, 8, 14, 20, 26 and 32 should be allowable in their present form, at least, by virtue of their dependency.

Therefore, the rejection of claims 2, 8, 14, 20, 26 and 32 under 35 U.S.C. § 103 has been overcome.

III. 35 U.S.C. § 103, Obviousness, Claims 5, 11, 17, 23, 29 and 35

Claims 5, 11, 17, 23, 29 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over APA and Krishan, and further in view of "Programming Embedded Systems in C and C++" by Michael Barr (hereinafter "Barr"). Barr is cited as disclosing a non-volatile random access memory to store data.

Barr, however, does not supply the deficiencies in APA and Krishan as discussed above, and claims 5, 11, 17, 23, 29 and 35 should be allowable in their present form, at least, by virtue of their dependency.

Therefore, the rejection of claims 5, 11, 17, 23, 29 and 35 under 35 U.S.C. § 103 has been overcome.

IV. 35 U.S.C. § 103, Obviousness, Claims 9, 21 and 23

Claims 9, 21 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over APA, Krishan and Kitagawa, and further in view of "Computer User's Dictionary" by Microsoft Press (hereinafter "Microsoft"). Microsoft is cited as teaching the definition of a "log file".

The Microsoft document, however, does not supply the deficiencies in the principal references, as described above, and claims 9, 21 and 33 should be allowable in their present form, at least, by virtue of their dependency.

Therefore, the rejection of claims 9, 21 and 33 under 35 U.S.C. § 103 has been overcome.

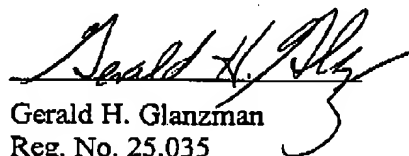
V. Conclusion

For all the above reasons, it is submitted that claims 1-36 are allowable in their present form, and that this application is in condition for allowance. It is, accordingly, respectfully requested that the Examiner so find and issue a Notice of Allowance in due course.

The Examiner is invited to call the undersigned at the below-listed telephone number if in the opinion of the examiner such a telephone conference would expedite or aid the prosecution and examination of this application.

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Respectfully submitted,



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